Virginia Department of Game and Inland Fisheries
Environmental Services Section
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Fish Relocation Best Practices
March 13, 2018

I. Purpose

To comply with regulatory requirements regarding protection of state Threatened or Endangered species, and to protect other sensitive fish species from harm during instream construction. Additional relocation efforts may be required if cofferdams are overtopped by high water events.

II. Methods

The Environmental Lead for the project (e.g., a VDOT biologist or environmental consultant) must have successfully completed fish identification and collection techniques training approved by the Virginia Department of Game and Inland Fisheries (VDGIF), or document other qualifying credentials to the satisfaction of VDGIF via possession of a valid Threatened/Endangered Species or Scientific Collection permit as appropriate prior to conducting such relocations. The Environmental Lead must be on site during the cofferdam installation and during the dewatering process to ensure these activities do not cause fish stress or injury. Fish caught within cofferdammed areas must be removed within 24 hours after placement of the cofferdams. If water depth within the cofferdam is too deep to remove fish, and it has been determined that partial dewatering is necessary prior to removing fish, then the pump intakes must be screened to prevent fish and aquatic biota from entering the intake. Details of the fish relocation efforts will be documented, photographed, and summarized in a final report to be submitted to VDGIF for state and federal listed species and the US Fish and Wildlife Service (USFWS) for federally listed species. Unless otherwise authorized by VDGIF and USFWS, fish relocation efforts shall not be conducted during applicable Time-of-Year Restrictions (TOYR) for any protected fish species likely to be encountered at the project site, as determined during the pre-project assessment described in step *1a* below.

1. Relocation techniques: The method(s) used may depend on the stream characteristics or conditions such as depth, flow, substrate, water clarity, and size or area of the potential impact zone. Methods are also dependent upon the target fish. For example, schooling fish like minnows may be more susceptible to seining, while benthic species such as darters may require electroshocking to capture. At some locations, it may be necessary to use a combination of these methods to ensure that all fish have been safely removed from the cofferdammed area. Because there is no flow within a cofferdam, one inherent problem in collection is the turbid conditions once the stream

bottom is disturbed. Collection efforts may need to be adjusted to account for these conditions.

a. *Pre-project assessment:* Prior to collection, the Environmental Lead will determine listed aquatic species that may likely be collected at the project site by accessing an authorized database. Special emphasis will be place on Threatened or Endangered species and visually similar species.

b. *Seining and dipnetting:* The least-lethal fish removal techniques include seining and/or dipnetting. These techniques minimize potential risks of distress or injury to the fish. Seining works most effectively when there are few if any instream obstacles such as large rocks, branches, and pilings or other structures. Seining also requires water depth greater than 1 ft. to efficiently capture fish. One advantage of seining over other techniques is that it does not rely on seeing the fish, so seining can be conducted in turbid water. Seines come in varying lengths and mesh sizes: a 10 ft. long by 3 ft. high seine with a mesh of 1/8" mesh is sufficient for most cofferdams. In many cases, three individuals are needed to operate a seine. One individual is positioned on each end holding the brail. Brails are maintained at a 45-degree angle on the stream bottom as the individuals move parallel to one another from one end of the cofferdammed area to the other. During this time, the bottom of the seine (lead line) is kept close to the stream bottom, while the top of the seine (float line) is maintained on the water's surface. While the seine is being pulled, the third individual frees it of any snags and assists in lifting the seine if necessary. Upon reaching the end of the cofferdammed area, the lead line is lifted out of the water, ensuring that the float line is out of the water as well. Visual inspection or observation with viewscopes or polarized sunglasses may be used to determine locations of fish concentrations and the effectiveness of this method. Dipnets may be used in conjunction with seine nets and, in shallow water, aquarium nets may be needed to remove fish.

c. *Electroshocking:* Electroshocking is most effective in clear water conditions or when obstacles prevent seining or dipnetting. It is also useful on alert and active species such as smallmouth bass, which are effective at avoiding nets. The downside of electroshocking is that it is potentially dangerous for staff and target organisms. As with seining, electroshocking requires at least two individuals: one individual operates the shocker while the other dips for fish and holds the bucket. Both individuals should carry a dipnet. The shocker should be tested and controls set outside of the cofferdammed area. Shocking should occur in a sweeping motion from side-to-side, ensuring that the area in front of the shocker is covered before moving forward. Staff should keep ahead of any sediment plumes kicked up during collection. All fish should be netted and immediately transferred to clean, oxygenated water in the bucket. At no time should anyone touch the water unless they are assured the electroshocker is

turned off. In the bucket, fish should quickly recover and begin swimming. If this is not the case, shocking unit controls must be adjusted and the voltage reduced. Fish numbers in the bucket must be monitored to ensure overcrowding does not occur. This is especially critical in summer when oxygen can be quickly depleted from warm water. Electrofishing will be conducted in a manner that minimizes harm to fish. The minimum effective voltage, pulse width, and pulse rates necessary to achieve the desired response (stunned fish) will be used. All efforts will be taken to ensure that fish do not come into contact with the electroshocker anode.

d. *Collection effort:* Efforts to capture fish within the cofferdammed area will be repeated until the surveyors are confident that all fish have been removed. This will require a minimum of three seine hauls with no fish collected. Capture or observation of any fish during a haul will precipitate three additional seine hauls (*i.e.*, seining will continue until no fish are collected during three successive hauls). In situations where electroshocking is needed, the entire cofferdammed area should be covered with special emphasis on difficult to reach places (crevices, rocks, etc.). When electroshocking, three passes should be conducted with no additional fish collections. As with seining, three additional passes must be initiated if a fish is caught or observed. If conditions become turbid with low visibility, seining should be conducted after an initial electroshocking effort, using the above-described depletion protocols.

e. *Fish Identification:* All fish will be identified to species level when possible, and at least to the Family level. Photographs will be taken of each species found during the fish removal efforts. All individual fish identified as possibly representing a Threatened or Endangered species will be photographed. Total counts will be taken for all species found. Notes will be taken regarding any fish showing signs of distress, parasitism, anomalies, or injuries.

2. <u>Fish handling and relocation:</u> After workup, captured fish will be relocated to suitable habitat outside of the cofferdam, and away from the work area. Handling of the fish will be minimized to the greatest extent possible. Individuals handling the fish will do so with clean, wet hands that are free of chemicals and toxins such as insect repellent, sunscreen, or lotions.

   If it has been determined that fish need to be relocated at least 100 meters upstream or downstream from the impact area, it may be necessary to place the fish in buckets of fresh streamwater so they can be released to suitable habitat. Fish held in the bucket will be checked often to ensure they are healthy and that water conditions are acceptable. Frequent water changes and a battery operated air pump may be necessary in certain situations. Except as stipulated below for incidentally killed fish, no individual fish will be kept or killed for scientific collection or other purposes.

Fish will be released in calm, shallow (<1 ft. deep) waters that facilitate their recovery and reorientation to river conditions. The fish will be monitored to ensure they remain upright and are able to actively swim. Any Threatened or Endangered species will be reported to VDGIF within 24 hours of capture. Any Threatened or Endangered fish incidentally taken (killed) will be preserved and delivered to VDGIF. Documentation of the fish removal operation will include project location, date, methods, personnel, water temperature, conductivity, flow conditions, water depth and clarity, substrate type, equipment settings, fish species, total numbers, fish condition, fish release location, and digital photographs.